

Appl. No. : 09/883,851
Filed : June 18, 2001

REMARKS

The following remarks are responsive to the May 28, 2003 Office Action. Claims 1-17 remain as originally filed and are presented for further consideration. Please reconsider the claims in view of the following remarks.

Comments on Amendments to the Specification

As described herein, Applicant has amended the specification to correct inadvertent typographical errors found while preparing this Response to the May 28, 2003 Office Action. Applicant respectfully submits that these amendments do not add new matter to the present application.

Response to Provisional Rejection of Claims 1-17 for Obviousness-Type Double Patenting

In the May 28, 2003 Office Action, the Examiner provisionally rejects Claims 1-17 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over Claims 1, 7, and 9-18 of Applicant's copending U.S. Patent Application No. 09/788,736. The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because each independent claim sets forth a particle generator, first and second subatomic particles, a photon detector, an alpha detector, and an analyzer.

Applicant respectfully traverses the rejection of Claims 1-17 for obviousness-type double patenting because Claims 1-17 of the present application are patentably distinct from Claims 1, 7, and 9-18 of U.S. Patent Application No. 09/788,736. In particular, pending Claims 1-17 each includes the limitation of a target position being a first distance from the material or chemical substance and the limitation of a particle detector array being "a second distance from the target position, the second distance larger than the first distance." Applicant submits that these limitations are not obvious in view of Claims 1, 7, and 9-18 of the copending application, and respectfully requests that the Examiner withdraw the provisional rejection. However, if the Examiner maintains this provisional rejection, Applicant will consider submitting a Terminal Disclaimer to overcome this rejection upon indication that Claims 1-17 of the present application are otherwise allowable.

Response to Objection to the Specification Under 35 U.S.C. § 112, First Paragraph

In the May 28, 2003 Office Action, the Examiner objects to the specification under 35 U.S.C. § 112, first paragraph as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention (i.e., failing to

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provide an enabling disclosure). The Examiner states that the specification is insufficient in failing to set forth, in an adequate and sufficient fashion, a description of the internals of the gamma spectrum analog-to-digital conversion and filtration process system.

Applicant respectfully submits that the specification clearly and accurately explains the analog-to-digital conversion and filtration of the gamma spectrum to a sufficient degree such that (i) persons skilled in the art would recognize the inventor's possession of the claimed invention, and (ii) persons skilled in the art can make and use the claimed invention. See, for example, the following description in the present specification at page 15, lines 12-18 (emphasis added):

In the present embodiment, the gamma spectrum 50 is electronically converted to a digital representation (Fig. 14) using a conventional analog-to-digital (A/D) converter 31 of the type well know[n] in the electronic arts. Each spectral line 52 is assigned a discrete binary value ("bin") representing its gamma energy level. Known spectral lines (bins) associated with carbon, nitrogen, and oxygen for the chosen type/energy of incident particle stream are then identified as described in Appendix A and further processed, while other unrelated lines 54 are electronically filtered (using, for example, a conventional digital filter) 33.

In addition, page 15, line 2 - page 17, line 9, pages 26-37, and Figures 8-14 of the present specification further disclose the analog-to-digital conversion and filtration of the gamma spectrum. Applicant also notes that electronic analog-to-digital converters and electronic digital filters were well known to persons skilled in the art at the time of invention. (See, e.g., Figure 3 of U.S. Patent No. 4,171,485 issued to Marshall; and Figure 2B of U.S. Patent No. 5,539,788 issued to Ruddy et al.)

For the above-stated reasons, Applicant respectfully submits that the specification conforms to 35 U.S.C. § 112, first paragraph by clearly and accurately explaining the gamma spectrum analog-to-digital conversion and filtration process system to a sufficient degree such that (i) persons skilled in the art would recognize the inventor's possession of the claimed invention, and (ii) persons skilled in the art can make and use the claimed invention. Applicant respectfully requests that the Examiner withdraw the objection to the present specification.

Response to Rejection of Claims 1-17 Under 35 U.S.C. § 112, First Paragraph

In the May 28, 2003 Office Action, the Examiner rejects Claims 1-17 under 35 U.S.C. § 112, first paragraph as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly

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connected, to make and/or use the claimed invention. The Examiner cites the same reasoning as was cited in the objection to the specification under 35 U.S.C. §112, first paragraph.

The discussion above in support of the sufficiency of the present specification under 35 U.S.C. § 112, first paragraph, is incorporated herein by reference. For the reasons set forth above, Applicant submits that Claims 1-17 are supported by enabling disclosure in the specification, and Applicant respectfully requests the Examiner to withdraw the rejection of Claims 1-17 and to pass Claims 1-17 to allowance.

Response to Rejection of Claims 5-12 and 14-17 Under 35 U.S.C. § 102(b)

In the May 28, 2003 Office Action, the Examiner rejects Claims 5-12 and 14-17 as being anticipated by U.S. Patent No. 5,076,993 issued to Sawa et al. ("Sawa"). The Examiner states that Sawa "sets forth a prior art system capable of meeting applicant's claimed inventive concept."

Claim 5

Claim 5 is directed to a system for detecting and imaging a chemical substance, the system including, among other limitations, "a particle source, the source generating a plurality of first subatomic particles and a plurality of second subatomic particles from a target position a first distance from the chemical substance ...; a particle detector array ... at a second distance from the target position, the second distance larger than the first distance" (emphasis added). Referring to Figure 18, the present application at page 23, line 26 - page 25, line 22 describes how the second distance (between the target position and the particle detector array) being larger than the first distance (between the target position and the chemical substance being analyzed) advantageously provides a magnification effect.

Applicant submits that Sawa does not disclose such a system as defined by Claim 5 of the present application. Sawa discloses a contraband detection system which uses a highly collimated beam of pulsed fast neutrons to cause (n, γ) reactions in a limited volume of an object under examination. The energies of the resultant gamma rays are used to identify the chemical elements within the volume of the object. The measured time-of-flight of the neutron pulse is used to locate the volume within the object. As disclosed by Sawa at column 3, line 24 - column 4, line 14:

the present invention uses a highly collimated short pulse of fast (high energy) neutrons to sequentially interrogate small volume elements ("voxels") of the object. ...

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In one embodiment, the pulsed beams of fast neutrons are collimated to a very high degree, i.e., pencil beams, using the kinematics of a $A(B, n)$ -nuclear endothermic reaction where $M_B \gg M_A$

In an alternative embodiment of the present invention, the pulsed fast neutrons are produced in the $A(B, n)$ reactions where $M_B \leq M_A$, i.e., reactions such as $D(d, n)$, $T(d, n)$ or $Li(p, n)$. Subdivisions of the interrogated object into voxels using this embodiment is obtained by using an external neutron beam collimator and may involve the positioning of gamma ray detectors.

Thus, Sawa discloses using a highly spatially constrained beam of neutron pulses to provide position-sensitive measurements of the chemical constituents of the object under examination.

Applicant submits that, in contrast to the present application, Sawa does not provide any disclosure regarding the relative distance between the source of neutrons and the chemical substance being analyzed. Furthermore, the system disclosed by Sawa does not utilize a particle detector or a particle detector array to analyze the chemical substance. Therefore, Applicant submits that Sawa does not provide any disclosure regarding the relative distances as described by Claim 5 of the present application.

In the background section at column 2, lines 40-56, Sawa also discloses one technique known in the art which detects explosives by measuring gamma rays produced by 14 MeV neutrons generated in a $T(d, n)^4He$ reaction in a target and directed to an object to be analyzed. This technique then uses the time difference between the alpha particle detection and the gamma ray detection to provide the position of the gamma ray source along the neutron "beam" defined by the solid angle subtended by the alpha particle detector. Sawa explains that each neutron is generated with a corresponding alpha particle emitted in an opposite direction and that "[a] small particle detector near the tritium target detects the alpha particle" (emphasis added). Thus, Sawa discloses a relatively small second distance (between the target and the particle detector). Sawa does not provide any disclosure regarding the first distance (between the target and the object being analyzed). Thus, Sawa does not disclose the relative distances as described by Claim 5 of the present application.

For the foregoing reasons, Applicant submits that Claim 5 includes limitations which are not disclosed by Sawa, so Claim 5 is not anticipated by Sawa. Applicant respectfully requests that the Examiner withdraw the rejection of Claim 5 and to pass Claim 5 to allowance.

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Claims 6-12 and 14-17

Claims 6, 7, 10, 12, and 14 depend from Claim 5, Claims 8 and 9 depend from Claim 7, Claim 11 depends from Claim 10, Claims 15 and 16 depend from Claim 14, and Claim 17 depends from Claim 16. Therefore, Claims 6-12 and 14-17 each includes all the limitations of Claim 5, as well as additional limitations of particular utility. Thus, Claims 6-12 and 14-17 are not anticipated by Sawa. Applicant respectfully requests that the Examiner to withdraw the rejection of Claims 6-12 and 14-17 and to pass Claims 6-12 and 14-17 to allowance.

Response to Rejection of Claims 1-4 and 13 Under 35 U.S.C. § 103(a)

In the May 28, 2003 Office Action, the Examiner rejects Claims 1-4 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Sawa in view of the "admitted prior art" identified by the Examiner in the present specification at page 8, lines 6-7 and 21+; pages 15-16, lines 12-7; and page 17, lines 1-7. The Examiner acknowledges that Sawa does not disclose the analyzer as defined in Claims 1-4 and 13 and that Sawa does not disclose the particle detector as being a scintillation detector. The Examiner further states that these limitations are within the "admitted prior art" and that modifications of the system disclosed by Sawa to include the known analyzers and detection systems would have been obvious to one having ordinary skill in the art at the time the invention was made "as such results are in no more than the use of conventionally known techniques/designs within the contraband detection system art."

Applicant assumes that the Examiner is using the term "admitted prior art" to refer to devices contained in the "Detailed Description of the Preferred Embodiments" portion of the present application which are described as being well known in the prior art, i.e.:

A conventional or advanced charged particle accelerator of the type well known in the art, such as the Model A-711 accelerator manufactured by MF Physics Corporation;

One or more high-resolution gamma detectors 26 of the type well known in the art;

Additionally, one or more scintillation (or comparable) detectors 28 of the type well know[n] in the art;

a conventional analog-to-digital (A/D) converter 31 of the type well know[n] in the electronic arts;

a constant fraction discriminator (CFD) which is well known in the signal processing and nuclear detection arts;

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any variety of conventional digital signal processing devices such as a "Lookup Table" LeCroy Model 2373 or comparable.

If Applicant is incorrect in this assumption, clarification from the Examiner is respectfully requested. Applicant asserts that other information within the passages cited by the Examiner in the "Detailed Description" is not admitted to be prior art. Furthermore, Applicant asserts that while these particular individual elements cited above are known in the art, the selection, the combination, and the motivation to combine the above-cited elements as defined in the claimed invention are not taught, disclosed, or suggested by the prior art.

Claim 1

Claim 1 is directed to a system for non-invasive stoichiometric detection and imaging of chemical elements and compounds in a material to be analyzed, the system including, among other limitations, "a particle generator, the particle generator generating a plurality of first subatomic particles and a plurality of second subatomic particles at a target position which is a first distance from the material to be analyzed ...; a particle detector array ... at a second distance from the target position, the second distance being larger than the first distance" (emphasis added).

As discussed above in relation to Claim 5, Applicant submits that Sawa does not provide any disclosure regarding the relative distances as described by Claim 1. Applicant submits that these limitations regarding the relative distances are not disclosed in the portions of the present application identified by the Examiner as "admitted prior art." Therefore, Applicant submits that Claim 1 is patentably distinguished over Sawa in view of the "admitted prior art" identified by the Examiner. Applicant respectfully requests the Examiner to withdraw this rejection and to pass Claim 1 to allowance.

Claims 2-4

Claims 2-4 depend from Claim 1, so Claims 2-4 each includes all the limitations of Claim 1, as well as additional limitations of particular utility. Thus, Claims 2-4 are not anticipated by Sawa. Applicant respectfully requests that the Examiner to withdraw the rejection of Claims 2-4 and to pass Claims 2-4 to allowance.

Claim 13

As discussed above, Sawa does not provide any disclosure regarding the relative distances as described by Claim 5, and these limitations regarding the relative distances are not

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disclosed in the portions of the present application identified by the Examiner as "admitted prior art." Claim 13 depends from Claim 5, so Claim 13 includes all the limitations of Claim 5, as well as additional limitations of particular utility. Therefore, Applicant submits that Claim 13 is patentably distinguished over Sawa in view of the "admitted prior art" identified by the Examiner. Applicant respectfully requests the Examiner to withdraw this rejection and to pass Claim 13 to allowance.

Summary

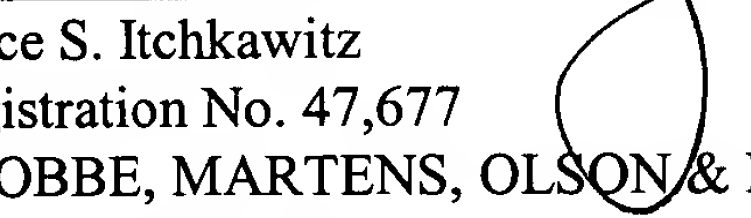
In view of the foregoing remarks, Applicant respectfully submits that Claims 1-17 are in condition for allowance, and Applicant respectfully requests allowance of Claims 1-17. If there is any further impediment to the prompt allowance of this application, or if the Examiner has any questions at all regarding the present application, the Examiner is respectfully invited to call the undersigned attorney of record at 949-721-2924 or at the telephone number listed below.

Respectfully submitted,

Dated: _____

9/26/03

By: _____


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